Explaining user adoption of virtual worlds: Towards a multipurpose motivational model

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Abstract:
This study reports on an attempt to enhance our understanding of the reasons behind virtual world usage. By providing a mixture of utilitarian and hedonic value, virtual worlds represent an emerging class of multipurpose information systems (MPIS). Previous research seems to fall short in explaining MPIS adoption, especially since key extrinsic and intrinsic motivators are left out of consideration. Drawing upon IT adoption research, motivation theory and the consumer behavior literature, this research extends available works and provides insight into the influence and roles of extrinsic and intrinsic motivation. Hypotheses are postulated and tested using a sample of 1627 users of the virtual world Second Life. The results confirm the majority of the hypotheses and support the comprehensive model. The findings indicate instantaneous effects of extrinsic and intrinsic motivation, and highlight reinforcing effects of intrinsic motivation. Implications for research and practice are discussed.

Keywords: virtual worlds, multipurpose information system, extrinsic motivation, intrinsic motivation, adoption behavior, escapism, visual attractiveness, entertainment value.

INTRODUCTION

Until recently, three dimensional virtual worlds, defined as computer-based simulated three dimensional environments that support collaborative work and social play (Benford, Greenhalgh, Rodden and Pycock, 2001), seemed to be the domain of a dedicated gaming community that employs information technology (IT) for the primary purpose of entertainment. If we consider the number of people that have adopted fast-rising virtual worlds like Habbo Hotel (94 million), Second Life (13.3 million), and Active Worlds (2 million)[1], however, in combination with the fact that Fortune 500 companies like IBM, Philips and ABN-AMRO have chosen to create presence in virtual worlds, it is obvious that the interest in virtual worlds is not limited only to gamers anymore. With increasing usage, the value of virtual worlds has been growing at an impressive rate. Commercial activities accounting for this growth are diverse in nature, and include experiential services like online gaming, avatar customization and movie theatres as well as more utility-oriented activities such as buying and selling land, financial services, education and training, and virtual property trading (Mennecke, Roche, Bray, Konsynski, Lester and Rowe, 2007).

Parallel to its growth and diversified usage, virtual world systems have gradually advanced into more complex systems. Initially developed to serve gaming communities, virtual worlds were primarily designed in line with the *intrinsic motives* of those intending to use the system, that is, to create pleasurable experiences and provide self-fulfilling value (Ryan and Deci, 2000b). As such, these virtual worlds could be classified as *hedonic information systems* (cf. Van der Heijden, 2004). More recently, virtual worlds have started to fulfill a more instrumental role by enabling its users to perform rather utilitarian tasks such as getting insurances, following courses, and building and leasing stores. As such, virtual worlds increasingly adapt to those willing to use the system for *extrinsic motives*, which relates to the achievement of goals/benefits external to the system-user interaction (Van der Heijden, 2004). From this perspective, virtual worlds contain characteristics that are distinctive for *utilitarian information systems* (see Van der Heijden, 2004). Given the mixture of hedonic and utilitarian functions, it becomes clear that the traditional distinction between these functions no longer

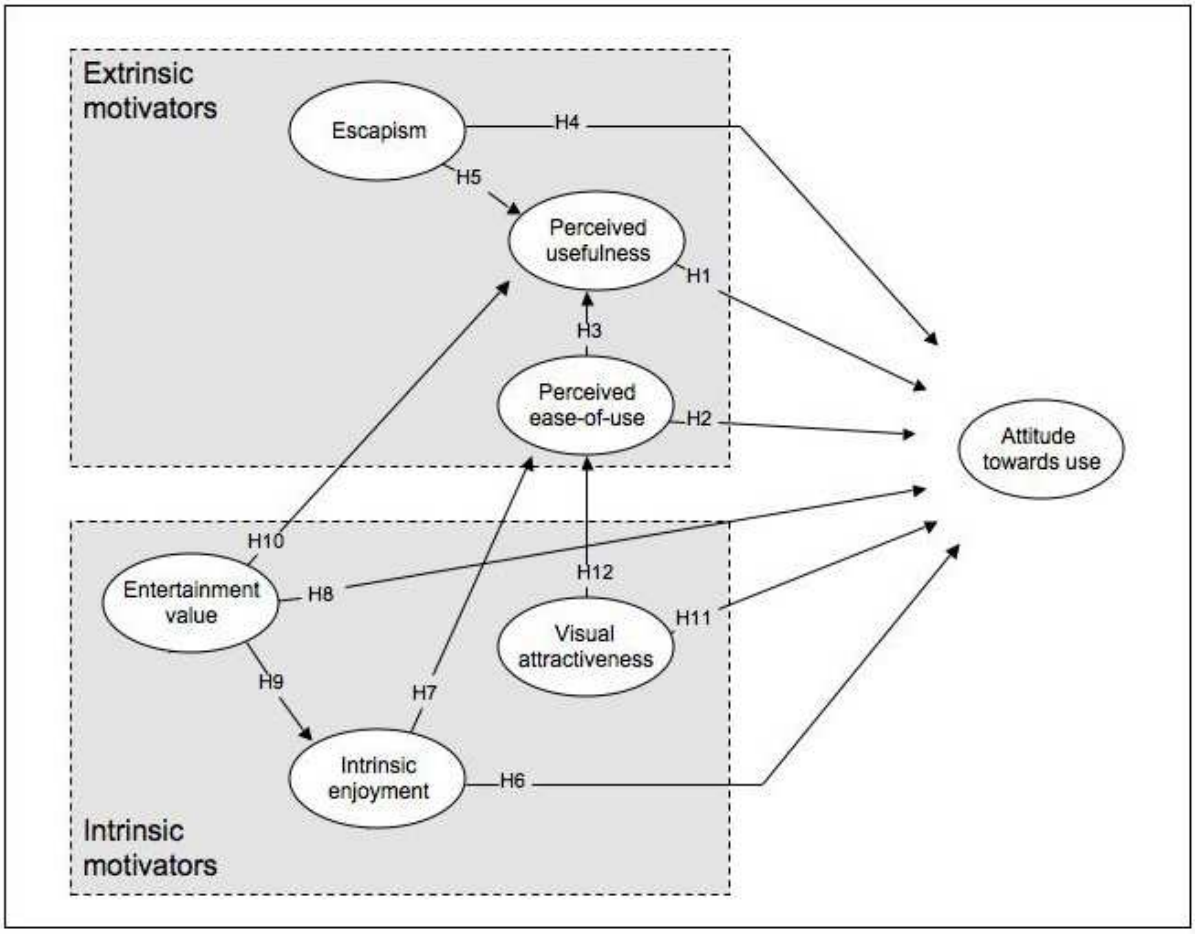
[1] All numbers apply to April 2008. The numbers are retrieved from the following websites: http://www.sulake.be/habbo/; http://secondlife.com/whatis/economy_stats.php; http://www.activeworlds.com/info/index.asp

applies to information systems like virtual worlds and thus demands for revision. Mirroring the view of Hong and Tam (2006) on IT beyond work settings, we view virtual worlds as *multipurpose information systems* (MPIS). MPIS is defined here as information system that provides an integrated suit of hedonic and utilitarian functions to its users.

In this paper we embrace the MPIS perspective, and introduce and test a comprehensive model on users' motivations to adopt virtual worlds. Given the multipurpose characteristics of virtual worlds, adoption of an MPIS perspective encompassing both intrinsic and extrinsic motives seems crucial. The vast majority of research on IT system adoption, however, has focused on either hedonic (e.g. Van der Heijden, 2004) or utilitarian systems (e.g. Venkatesh, 2000). Consequently, these works fall short since they address at least half of a system's nature and therefore fail to provide an overall picture of the intrinsic and extrinsic motivators behind MPIS use. Furthermore, since the interrelationships between both types of motivators are relatively unexplored, possible synergies between hedonic and utilitarian system characteristics that might guide system developers remain untainted. This research intends to further our understanding of virtual worlds by introducing an MPIS model that captures both intrinsic and extrinsic believes and as such integrates the hedonic and utilitarian system paradigms.

This study draws upon IT adoption studies, motivation theory and consumer behavior research to propose the theoretical model shown in figure 1.

Figure 1. Proposed theoretical model and research hypotheses



The model incorporates the general technology beliefs usefulness and ease of use as extrinsic motives, and introduces the construct escapism as extrinsic motive to the domain of information systems. The first two motives are derived from IT adoption studies (e.g. Davis 1989; Davis, Bagozzi and Warshaw, 1989). To conceptualize the concept of escapism, we draw on the consumer behavior literature (e.g. Hirschman, 1983). Building upon consumer behavior studies (e.g. Mathwick, Malhotra and Ridgon, 2001 and 2002; Mathwick and Ridgon, 2004) and research on hedonic information system acceptance (e.g. Davis, Bagozzi and Warshaw, 1992; Van der Heijden, 2004) the intrinsic motives enjoyment, virtual attractiveness and entertainment value are added to the model.

This research intends to make the following contributions. First, we expand the scope of motivational theory in the field of information systems to a more complete range of motivators. The proposed extensions enable us to better understand the behavioral drivers behind virtual

world usage, and benefit designers to align system development to the full range of functions that virtual worlds provide. Second, in mapping the inter-motivational relationships, this study proposes and confirms a reinforcing effect of intrinsic motivations on extrinsic motivations. As such, drawing upon motivational theory (e.g. Deci, 1975; Deci and Ryan, 1985; Hull, 1943) and IT adoption research (e.g. Venkatesh, 2000; Wakefield and Whitten, 2006), we aim to theorize and structure MPIS model building. Third, this research underlines the inability of general technology beliefs (i.e. usefulness, ease of use) to fully explain the adoption of more complex information systems. We challenge the parsimony of previous models such as the Technology Acceptance Model (TAM) (cf. Plouffe, Hulland and Vandenbosch, 2001; Venkatesh, 2000), including their claim to sufficiency (i.e. the influence of external variables to behavior is mediated by constructs in the model; see also Ajzen and Fishbein, 1980), and justify model comprehensiveness as criterion when developing theory on the adoption of virtual worlds as MPIS.

The paper is structured as follows. We first discuss the literature on the nature and value of information systems, and address the relationships between information system value and consumer' IT adoption motivations. We conceptualize the key constructs in our model and formulate hypotheses. The research model is then tested in a large-scale survey within the virtual world Second Life. We will discuss the results of this empirical study, and the conclusions that can be drawn from these. Finally, we will go into the theoretical, methodological and practical implications of our findings.

THEORETICAL BACKGROUND.

Information system value

Research on the adoption of IT has classified information systems according to the value they provide to users. Reflecting the user's overall experience of interacting with the system based on both the system's usefulness and provision of enjoyment and/or fun (adapted from Babin, Darden and Griffin, 1994; Holbrook, 1986; Zeithaml, 1988), system value is assumed to be an important determinant of adoption behavior. A common value-based classification comes from the consumer behavior literature (e.g. Babin et al., 1994; Hirschman and Holbrook, 1982; Holbrook and Hirschman, 1982a; Tauber, 1972), and is used to differentiate between utilitarian and hedonic information systems (cf. Van der Heijden, 2004).

Utilitarian information systems refer to systems that are mainly used to achieve goals that are external to system usage (Van der Heijden, 2004). As such, they provide instrumental utility to the user. Utilitarian system usage can be described as task-related, rational (Babin et al., 1994), cognitive, and with a work mentality (Hirschman and Holbrook, 1982). The adoption process of utilitarian systems usually follows a rational information-processing model (cf. Bettman, 1979). Given its instrumental focus, a vital design principle of utilitarian systems is to provide productive use (Van der Heijden, 2004), which can be accomplished by implementing relatively objective (Holbrook and Hirschman, 1982a), task-related and functional features such as navigation structures, factual information, instructions and sorting modules. Typical utilitarian systems include ERP systems, text editors, training systems, and online stores in utilitarian products (e.g. office equipment).

Hedonic information systems are systems that are used for its own sake and provide feelings of enjoyment, pleasure, excitement and escapism (cf. Babin et al., 1994; Massey, Khatri and Montoya-Weiss, 2007). The usage of hedonic systems is mainly experiential in nature, which implies that users strive for instant hedonic pleasure while the consequences of usage appear in the fun and pleasure of the experience itself (Holbrook and Hirschman, 1982 a, b). Affective reactions and feelings are assumed to dominate the adoption process of hedonic systems (Hirschman and Holbrook, 1982; Mowen and Minor, 2001). Since using the system itself is the main goal of hedonic system usage, designers are encouraged to stimulate prolonged use (Van der Heijden, 2004). Prolonged use might be stimulated by implementing relatively subjective and symbolic features (see Hirschman and Holbrook, 1982) such as attractive layouts, color schemes, animations and sounds. Typical hedonic systems are online gaming, social communities, music download services, and movie websites.

While the distinction between utilitarian and hedonic information systems is widely accepted, and research has demonstrated the predictive power of this value dichotomy in explaining the relative weights of IT adoption determinants (e.g. Van der Heijden, 2004; Wakefield and Whitten, 2006), recent technological developments seem to challenge its applicability. In particular, we refer to the emerging class of systems that provide both utilitarian and hedonic value (e.g. smart phones; mobile data services; virtual worlds). These systems, in our introduction alluded to as multipurpose information systems (MPIS), incorporate instrumental and experiential functions in one environment (Hong and Tam, 2006). A main

challenge for developers of MIPS is how to apply an integrated suite of instrumental and experiential functions, in order to enable productive *and* prolonged use. Such integration demands for thorough understanding of the drivers of the adoption process and stresses the need for an integration and extension of theories concerning IT adoption and use.

Motivation theory

A significant body of research has applied motivation theory (Deci, 1975; Deci and Ryan, 1985; Vallerand, 1997) to predict the acceptance of information systems. Referring to "enduring predispositions that arouse and direct behavior toward certain goals (Engel, Miniard and Blackwell, 1995, p. g-9), motives are seen as key determinants of IT adoption. Two types of motivation exist: extrinsic motivation and intrinsic motivation[2].

Extrinsic motivation is defined as "doing something because it leads to a separable outcome" (Ryan and Deci, 2000b, p. 55). Extrinsic motivated behavior is driven by the instrumental value of the performed activity (Ryan and Deci, 2000b), which is derived from the outcome of the activity instead of the activity itself (Davis et al., 1992). Given the instrumental value, extrinsic motives are theorized as dominant predictors of utilitarian system usage (Van der Heijden, 2004; Wakefield and Whitten, 2006). Most theories on IT adoption (see Venkatesh, Morris, Davis and Davis, 2003 for an overview) are productivity-oriented and use extrinsic motives such as 'perceived usefulness' and 'perceived ease-of-use' as key determinants of utilitarian system use.

Extrinsic motives can either be controlled or autonomous in nature[3] (Grouzet, Vallerand, Thill and Provencher, 2004). Controlled extrinsic motivated behavior refers to activities that are mainly done by external obligation and/or internal pressure (e.g. guilt, pride, ego) to obtain something positive or to avoid something negative (Deci and Ryan, 1985; Vallerand and Bissonnette, 1992). Examples of controlled extrinsic motivated system use include the usage of

[2] In consumer behavior research, extrinsic motives/intrinsic motives are also known as rational/emotional motives (Copeland, 1927) or utilitarian motives/hedonic motives (Hirschman and Holbrook, 1982). We acknowledge that these terms can be used interchangeably, though use the extrinsic/intrinsic wording in line with research on IT adoption (e.g. Davis et al., 1992; Venkatesh, 1999; Venkatesh and Brown, 2001).

[3] Controlled extrinsic motives can be distinguished into 'identified regulation' and 'integrated regulation'. Autonomous extrinsic motives can be separated into 'external regulation' and 'introjected regulation'. Falling outside the scope of this research, we suggest the self-determination theory and the organismic integration theory (Deci and Ryan, 1985; Deci and Ryan, 2000; Ryan and Deci, 2000 a, b) for further reading.

tax collection systems, inventory control systems, and customs information systems. Autonomous extrinsic motivation refers to doing something mainly out choice than out of external obligation and/or internal pressure (Grouzet et al., 2004, p. 332). This kind of behavior is relatively self-determined and concerns the performing of an externally motivated behavior that has been accepted as being of high personal importance (Deci and Ryan, 2000) and/or fits with the person's needs, life activities and valued goals (Deci and Ryan, 1985; Vallerand and Bissonnette, 1992). Examples of systems which usage is driven by autonomous extrinsic motivations are social support communities (see Ridings and Gefen, 2004), online insurance websites, and navigation software. In this study, we view extrinsic motives behind virtual world adoption as autonomous concepts. This implies that we consider virtual world adoption as relatively self-determined activity, which seems justified given our user view on virtual worlds as systems to support both collaborative work and social play.

Intrinsic motivation refers to "doing an activity for the inherent satisfaction of the activity itself" (Ryan and Deci, 2000a, p. 71). Intrinsic motivated behavior is self-determined, volitional (Deci and Ryan, 1985) and involves people engaging in activities that they find interesting, new, and provide optimal challenge (Deci and Ryan, 2000, p. 235). Intrinsic motivation derives its value from the appreciation of the activity itself rather than its instrumental outcome (Davis et al., 1992; Mathwick et al., 2001). Intrinsic motivation is closely associated with the general need for feelings of competence and autonomy, and integrally relates to emotions such as emotions of enjoyment and excitement (Deci, 1975; Deci and Ryan, 1985). In IS research, intrinsic motives are seen as strong predictors of hedonic system usage (Venkatesh, 1999). Intrinsic motivation may have different forms, including enjoyment, excitement (Deci, 1975), escapism (Venkatesh and Brown, 2001), and visual attractiveness (Mathwick et al., 2001). The vast majority of IT adoption studies, however, has centered on the belief 'perceived enjoyment', which has been related successfully to hedonic system usage (see Davis et al., 1992; Van der Heijden, 2004; Wakefield and Whitten, 2006).

RESEARCH FRAMEWORK AND HYPOTHESES.

This study applies an integrated approach to put forward a model on virtual world adoption (figure 1). Given multipurpose nature of virtual worlds (i.e. its utilitarian and hedonic nature), there is an obvious need for an integration of existing models on utilitarian and hedonic system

adoption. Integration is necessary because the distinction between hedonic and utilitarian becomes less relevant when we consider established information technologies that integrate both functions. Agarwal and Karahanna (2000), for instance, propose the adoption of a holistic view of user behaviors toward information technology. Here, we adopt such a holistic view, in the sense that we posit an integration of theories concerning both extrinsic and intrinsic motives of information system adoption.

Drawing upon adoption theory, we integrate the technology-related extrinsic motives perceived usefulness and perceived ease of use with the intrinsic motive intrinsic enjoyment. Using the literature on consumer behavior, we extend the model by adding the extrinsic motive escapism and further unpack the concept of intrinsic motivation by including visual attractiveness and entertainment value. The logic behind the proposed model structure is derived from three theoretical considerations. First, using the attitude towards use as key independent, we include the general technology beliefs perceived usefulness and perceived ease of use as proposed in TAM. The empirical robustness of this structure supports our decision, and assumes that both constructs explain substantial part of the attitude variance. Second, we challenge the parsimony and claim to sufficiency of TAM and expand our model by including the other extrinsic and intrinsic beliefs referred to above. In line with research suggesting direct effects of 'external variables' on behavior (e.g. Hong and Tam, 2006; Van der Heijden, 2004; Vijayasarathy, 2004), we posit direct effects on attitude. Third, elaborating on classical drive theory (see Hull, 1943), we view intrinsic motivation as reinforcer of extrinsic motivation. Empirical study in work and educational settings (for an overview: see Deci and Ryan, 1985) supports this rational, especially since it demonstrates that activities that are perceived as pleasurable, challenging, autonomous, and/or interesting improve the instrumental value of the activity (e.g. performance, achievement, task effectiveness). Recent IT adoption research further strengthens the assumed reinforcement effect, especially since it suggests favorable effects of intrinsic motivation on perceptions of instrumentality (e.g. perceived usefulness (Wakefield and Whitten, 2006); perceived ease of use (Venkatesh, 1999 and 2000). In the remainder of this section we elaborate on the model structure, and expand on the research constructs and their hypothesized relationships.

General technology beliefs

Since its conception in 1989, the Technology Acceptance Model has spawned a whole research tradition into the factors affecting adoption and use of various IT applications. This model is an adaptation of the theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1975) to explain and predict the behaviors of people in a specific situation. The core of TAM is built on two specific beliefs explaining user acceptance of information technology (Davis, 1989; Davis et al., 1989): *perceived usefulness* and *perceived ease of use*. Both these beliefs are extrinsic motivators, focusing on the instrumental value of system use (Venkatesh, 2000).

Perceived usefulness is defined as "the degree to which a technology is perceived as providing benefits in performing certain activities" (Davis, in Hong and Tam 2006, p. 165), whereas perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). As in virtual worlds, usefulness is less directly task-related yet still refers to primarily utilitarian values, we use a somewhat broader conceptualization of this variable than Davis' (1989) original definition. We base our conceptualization of perceived usefulness on Hong and Tam (2006), Porter and Donthu (2006) and Van der Heijden (2003), who have used this concept in a less directly task-related context as well.

A fundamental assumption in TAM (and one that has found much empirical support) is that both these beliefs are positively related to attitude towards system use. This leads to our first two hypotheses:

H1. Perceived usefulness positively influences the attitude towards using virtual worlds.

H2. Perceived ease of use positively influences the attitude towards using virtual worlds.

Previous TAM-based research found that both beliefs are also mutually related, in the sense that a system's perceived usefulness increases as its ease of use is higher (Lee, Cheung and Chen, 2005; Legris, Ingham and Collerette, 2003; Moon and Kim, 2001). Therefore, we hypothesize:

H3. Perceived ease of use positively influences perceived usefulness.

Escapism

As conceptualized by Hirschman (1983), escapism is an extrinsic motivation: it "offers the individual an avenue to a more desirable state of being than the one presently experienced" (p.

64), which means it has a utilitarian function as an anxiety reduction mechanism. At its core, escapism refers to users' motivation to "'leave' the reality in which they live in a cognitive and emotional way" (Henning and Vorderer, 2001, p. 101). Although in consumer behavior research, such motivations are often directly related to hedonic values (Babin et al., 1994; Bridges and Florsheim, 2007), and escapism can also be conceptualized as related to "playfulness" and "pretending" (Mathwick et al., 2001), we feel it is primarily an extrinsic motivation. The instrumental value that is derived from technology use ("getting away from it al") is an important driver for behavior here. This is in line with Hirschman and Holbrook's (1982) concept of "imaginative constructs of reality", where acts are not based on what users know to be real, but rather on what they desire reality to be. Projective fantasies or absorbing experiences (Hirschman and Holbrook, 1982) can be strong drivers for the use of environments such as virtual worlds. The social play inherent in virtual worlds can be expected to positively contribute to this value, and thus to be positively appreciated by individuals with escapist motivations, leading to the following hypothesis:

H4. Escapism positively influences the attitude towards using virtual worlds.

In line with the above, it can be assumed that this motivation will not only directly exert a positive influence on attitude towards use, but will also be positively related to perceived usefulness, where anxiety reduction is the benefit that can be derived from system use (Hong and Tam, 2006). Therefore, we hypothesize:

H5. Escapism positively influences perceived usefulness of virtual worlds.

Elaborating intrinsic motivations: enjoyment, entertainment and visual attractiveness

In addition to the extrinsic motivations discussed above, intrinsic motivations have also been found to influence technology use (Van der Heijden, 2003; Venkatesh, 1999). In this section, such intrinsic motivations will be discussed in relation to virtual worlds. Our discussion starts with the way that intrinsic motivations have been used in previous research related to perceived usefulness and perceived ease of use, and then elaborates on this on the basis of the experiential view of consumer behavior, thus expanding the scope of motivational theory in the field of information systems to a more complete range of motivators. The experiential view posits that consumption can be seen as involving "a steady flow of fantasies, feelings, and fun" (Hollbrook

and Hirschman, 1982a, p. 132). Mathwick et al. (2001) use this view as point of departure for the development of their experiential value scale, a scale that can be used to assess offline and online retail shopping experiences. Intrinsic motivation factors are explicitly included in this scale through two key dimensions that reflect the *playfulness* and *aesthetics* of a(n) (online) shopping experience. Although some of the dimensions recognized by Mathwick et al. have been used in prior research on IT adoption and usage (e.g. playfulness and enjoyment have already been recognized to be an important factor in IT adoption processes by Venkatesh (2000)), the scale also encompasses key dimensions that are new to IS research. The key intrinsic motivations for using virtual worlds discussed in this section are: intrinsic enjoyment, entertainment, and visual attractiveness.

Intrinsic enjoyment

The TAM has received considerable empirical support over the years (Adams, Nelson and Todd, 1992; Chau and Hu, 2002; Davis and Venkatesh, 1996; Legris et al., 2003), and has seen numerous extensions in terms of new variables and relationships being added to the model. Because social play is an important element supported by virtual worlds (Benford et al., 2001) a relevant extension of TAM in the context of the study reported here is the inclusion of *perceived enjoyment*. Davis et al. (1992) first introduced perceived enjoyment as "the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (p. 1113).

The variable of enjoyment is especially relevant in relation to information systems with a hedonic function. Previous research in Web-based environments has found empirical support for enjoyment as an influence on attitude towards, and intention to use such environments (Atkinson and Kydd, 1997; Moon and Kim, 2001; Teo, Lim and Lai, 1999; Van der Heijden, 2003). In terms of the hedonic function of using virtual worlds, enjoyment can be expected to be an important influence:

H6. Intrinsic enjoyment positively influences the attitude towards using virtual worlds.

In line with the relationship between perceived ease of use and perceived usefulness, perceived ease of use can also be associated with enjoyment. Venkatesh (2000) argues that users' perceptions of ease of use are adjusted based on actual experiences with a system. More

specifically, Venkatesh argues, the more a user enjoys the interaction with a system, the more they tend to "…'underestimate' the difficulty of the means or process of using a system because they quite simply enjoy the process and do not perceive it as being effortful…" (p. 348). This line of reasoning is also found in Venkatesh (1999) and Wakefield and Whitten (2006) and leads to the following hypothesis which shows a reinforcing effect of intrinsic on extrinsic motivators:
H7. Intrinsic enjoyment positively influences perceived ease of use of virtual worlds

Entertainment value

Entertainment value can be defined as the perceived degree to which the use of an information system is a pleasant and likeable experience (Ducoffe, 1996) and lifts the user's spirit (Mathwick et al., 2001). Although both intrinsic enjoyment and entertainment value are fun-related notions, they are conceptually distinct. An individual may experience an information system as entertaining, regardless of the reason why he uses it. In contrast, when this individual intrinsically enjoys using the information system, the pleasure is not just an added benefit of using the system to pursue some other goal, but rather is actively sought after and a purpose in itself (cf. Brown and Venkatesh, 2005; Mathwick et al., 2001).

As was argued in the above, based on the literature it can be expected that perceived fun, in the sense of intrinsic enjoyment, positively impacts the attitude towards using the virtual world. Given that intrinsic enjoyment and entertainment value concepts share the element of fun, the same arguments apply to entertainment value. Indeed, the literature provides a substantial body of evidence suggesting a positive effect of entertainment value on digital environment related attitudes such as the attitude towards using an information system (Bruner and Kumar, 2005; Dabholkar and Bagozzi, 2002), towards a website (Kang and Kim, 2006; Richard, 2005), and towards Internet or mobile advertising (Tsang, Ho and Liang, 2004; Xu. Liao and Li, 2008). Accordingly, it can be anticipated that:
H8. Entertainment value positively influences the attitude towards using virtual worlds.

Arguably, when the use of an information system is perceived to be fun this is likely to increase the degree to which this fun is seen as an end in itself. Therefore, it is expected that:
H9. Entertainment value positively influences intrinsic enjoyment of virtual worlds.

A system that entertains the user provides this individual with a service and shows that it is capable of achieving something that the user values, regardless of why the system is used. Therefore, it stands to reason that the more the system is seen as entertaining, the more this gives the user the indication that the system will also perform adequately when it is put to use to increase the individual's performance. This is supported by the research of D'Ambra and Rice (2001) who found a positive influence of entertainment value of websites on perceived personal performance. Consequently, we again hypothesize a reinforcing effect of an intrinsic on an extrinsic motivator:

H10. Entertainment value positively influences perceived usefulness of virtual worlds.

Visual attractiveness

The impact of the visual appeal of information systems on user perceptions and behavior has been investigated in the context of the World-Wide Web, Human Computer Interaction (HCI) and mobile commerce. For instance, visual attractiveness is found to be an important determinant of user satisfaction related to web site usage (Lindgaard and Dedek, 2003). Research performed in the field of mobile commerce revealed that design aesthetics appear to influence users' loyalty towards mobile applications (Cyr, Head and Ivanov, 2006). This line of reasoning can be extended to virtual worlds, as virtual world technologies fully support the development of visually attractive environments aiming at creating game-like user experiences. In line with previous research (e.g. Van der Heijden, 2003) we assume that the visual attractiveness of virtual worlds will be associated with a positive attitude towards using such environments:

H11: Visual attractiveness positively influences attitude towards using virtual worlds

Visual attractiveness has also been found to be related to perceived ease of use. For example, Tractinsky, Katz and Ikar (2000) found a tight relationship between users' perceptions of interface aesthetics and perceptions of the usability of an information system. Characteristics of the user-system interaction, such as visual appeal and usability, were found to play a role in driving perceived ease of use (Venkatesh, 2000). Van der Heijden (2003, p. 544) introduced the notion of "perceived visual attractiveness" defined as "the degree to which a person believes that the website is aesthetically pleasing to the eye" and found perceived visual attractiveness to positively influence both perceived usefulness and perceived ease-of-use. All in all, these

findings lead to the following hypothesis, which again establishes a relationship between an intrinsic and an extrinsic motivator:

H12: Visual attractiveness positively influences perceived ease of use of virtual worlds.

METHOD

Procedure

We conducted a survey to collect empirical data. The sample consisted of Dutch registered users of the virtual world Second Life. An e-mail with an invitation to participate voluntarily in the study was send to a mailing list of 50.000 registered users. At the time of the research, all users voluntarily signed up for the mailing list, and were not exposed to preceding questionnaires. The invitation included a link that led to a web-based survey. As incentive, respondents were asked to fill in their e-mail address to engage in the raffle of ten book tokens of 20 euro. The online questionnaire addressed perceptions of perceived usefulness, perceived ease of use, escapism, intrinsic enjoyment, entertainment value, visual attractiveness, and attitude towards use. Moreover, socio-demographics and a measure to assess the perceived utilitarian-hedonic value of the virtual world were included.

The questionnaire was constructed using the following procedures. First, an English draft questionnaire was constructed and translated into Dutch, using a combination of standard translation and back translation (cf. Van Auken, Barry and Bagozzi, 2006). A bilingual speaker whose native language is Dutch translated the questionnaire into Dutch. A second bilingual speaker whose base language is English then compared this Dutch questionnaire to the original English questionnaire. Afterwards, the two bilingual speakers and the three members of the research team discussed the differences (cf. Blodgett, Lu, Rose and Vitell, 2001; Van Auken et al., 2006) and refined the translation were needed. Second, a pretest was conducted to assess the wording and interpretability of the questionnaire and introduction (cf. Rose, 1999). Under supervision of a member of the research team, 5 graduate students participated in the test. The participants were asked to evaluate the clarity and interpretability of the questionnaire and to suggest for improvements. Some minor modifications were made.

Measures

Multi-item scales were used to measure the research constructs. For each scale, items were collected based upon previous literature (Appendix). We took care to solely select items that added to the conceptualization of the constructs as applied in our research (translation validity; see Netemeyer, Bearden and Sharma, 2003). All items were part of reliable and validated measurement instruments. We tailored the items to the context of our study (i.e. made them target specific). For example, we changed the target of the original perceived usefulness items from "The Internet" into "Second Life" and, following its conceptualization in this study, assured that the items reflected the value of using Second Life as MPIS. Additionally, we adapted some items of escapism, entertainment value, and visual attractiveness to make them more suitable for an online context. Except for the utilitarian-hedonic value instrument, which was measured using 7-point semantic differentials, all constructs were measured using 7-point Likert scales (strongly disagree-strongly agree).

Sample

The data was collected from 29th of June to the 10th (including) of July 2007. Eventually, 1627 filled in the online questionnaire. Table one displays the sample demographics.

Table 1. Sample demographics (n=1627)

Measure	Items	Frequency	Percent
Gender	Male	925	56.9
	Female	702	43.1
Age	<20	122	7.5
	20-29	233	14.3
	30-39	444	27.3
	40-49	418	25.7
	50-59	273	16.8
	60-69	113	6.9
	>69	24	1.5
Second Life experience	Very inexperienced	427	26.2
	Inexperienced	449	27.6
	Neutral	385	23.7
	Experienced	314	19.3
	Very experienced	52	3.2
Frequency of using Second Life	Never	81	5
	Once per year	90	5.5
	A couple of times per year	219	13.5
	Once per month	186	11.4
	A couple of times per month	205	12.6
	Once per week	133	8.2
	A couple of times per week	292	17.9
	Daily	421	25.9
Frequency of buying digital products at Second Life	Never	978	60.1
	Occasionally	345	21.2
	Regularly	216	13.3
	Often	88	5.4
Utilitarian-hedonic value of SL*	Very utilitarian (1)	22	1.4
	Quite utilitarian	15	0.9
	Some utilitarian	62	3.8
	Neutral	470	28.9
	Some hedonic	555	34.1
	Quite hedonic	355	21.8
	Very hedonic (7)	148	9.1

** Multi-item instrument (Appendix). Frequencies in the table are derived from composite scores.*

The demographics demonstrate that the majority of the respondents is male, between 30 and 50 years old. A slight majority (52%, n=846) indicates to use Second Life once per week or more, while a minority (39.9%, n=649) reports to buy at Second Life. The data confirms the multipurpose character of Second Life since a majority of the respondents (66.8%, n=1087) perceives its value to range from "some utilitarian" to "some hedonic". Although the skewness of the distribution seems to favor the hedonic value of Second Life, which might be predictive for the role of intrinsic motivation, only a minority indicates to perceive this virtual world to be very dominant on utilitarian value (1.4%, n=22) or hedonic value (9.1%, n=148).

RESULTS

Given the importance of unidimensionality for adequate measurement (cf. Gerbing and Anderson, 1988), we first applied EFA to test whether the measurement items only tapped one underlying dimension. Then, Partially Least Squares (PLS) modeling was utilized to further assess the measurement model and to estimate the structural model. PLS was selected since our model is rather complex and our research intends to develop rather than confirm theory (see Fornell and Bookstein, 1982). Moreover, PLS has some specific advantages including minimal demands on data distribution and sample size (Chin, 1995; Chin, Marcolin and Newsted, 2003).

Test of dimensionality

EFA was run using the principle components model with the oblique rotation technique (Direct Oblimin). The oblique rotation was applied since the goal of the EFA was to obtain theoretical meaningful factors, and not to reduce a number of variables (Hair, Anderson, Tatham and Black, 1998). The data passed the thresholds for sampling adequacy (KMO MSA 0.957, Bartlett's test of sphericity 56554.6, $p < .001$). Four items (see Appendix) were removed since they demonstrated high cross-loadings. The final factor solution was then derived. Together, the 7 factors explained 84.6% of the variance in the data. Unidimensionality of the measures was confirmed since each item loaded highest on its intended factor. Moreover, except for one intrincic enjoyment item, all items loaded very strong on their underlying factors (table 2). As such, preliminary evidence for convergent validity and discriminant validity was provided.

Measurement model

PLS was used to assess the reliability and validity of the measures. We utilized the software package Smart PLS (Ringle, Wende and Will, 2005) of the University of Hamburg to compute factor loadings, Cronbach's alpha, composite reliability and Average Variance Extracted (AVE). In addition, SPSS (version 13, Mac) was used to compute minimum item-to-total correlations. Table 2 displays the results.

Table 2. Dimensionality, reliability and convergent validity statistics

Construct (no. of items)	Factor loadings (EFA)	Factor loadings (PLS)	α	Composite reliability	Minimum item-to - total correlation	AVE
Perceived usefulness (5)	0.86; 0.78; 0.83; 0.93; 0.87	0.94; 0.92; 0.88; 0.88; 0.88	0.94	0.95	0.69	0.81
Perceived ease of use (4)	0.97; 0.97; 0.92; 0.95	0.95; 0.96; 0.94; 0.97	0.97	0.98	0.83	0.91
Escapism (4)	0.82; 0.86; 0.91; 0.90	0.87; 0.93; 0.90; 0.88	0.92	0.94	0.64	0.81
Intrinsic enjoyment (3)	0.95; 0.94; 0.47	0.90; 0.93; 0.90	0.90	0.93	0.66	0.83
Entertainment value (4)	0.75; 0.72; 0.71; 0.60	0.92; 0.91; 0.93; 0.81	0.91	0.94	0.64	0.80
Visual attractiveness (4)	0.91; 0.94; 0.91; 0.93	0.93; 0.93; 0.95; 0.96	0.96	0.97	0.83	0.88
Attitude towards use (4)	0.88; 0.91; 0.84; 0.92	0.91; 0.87; 0.92; 0.93	0.93	0.95	0.70	0.82

The results strongly confirm the reliability of the measures. The alpha's and composite reliability scores exceed the value of 0.90, and all AVE's surpass the 0.50 guideline (see Ping, 2004). Convergent validity was assessed by factor loadings (PLS), alphas, AVE's and minimum item-to-total correlations. All scores exceed accepted rules of thumb (factor loadings: 0.70, see Ko, Kirsch and King, 2005; alpha: 0.80, see Ping, 2004; AVE: 0.50, see Wasko and Faraj, 2005; minimum item-to-total correlations, 0.40, see Jayanti and Burns, 1998). As such, convergent validity is established. Finally, we assessed for discriminant validity in two steps. First, we used the PLS output to study the within-construct item factor loadings and compared these loadings to across-construct item loadings (cf. Wasko and Faraj, 2005). Since all within-construct item loadings were high, and lower than the cross-loadings, discriminant validity can be assumed. Second, we studied the individual AVE's and compared the scores with the square correlations among the constructs (cf. Chin, 1998a). All AVE's exceed the values of the square correlations

among the constructs in the corresponding rows and columns (Table 3). As such, discriminant validity is demonstrated.

Table 3. Discriminant validity: AVE's versus cross-construct squared correlations

Construct	Perceived usefulness	Perceived ease of use	Escapism	Intrinsic enjoyment	Entertainment value	Visual attractiveness	Attitude towards use
Perceived usefulness	**0.81**						
Perceived ease of use	0.16	**0.91**					
Escapism	0.38	0.11	**0.81**				
Intrinsic enjoyment	0.21	0.17	0.25	**0.83**			
Entertainment value	0.41	0.23	0.44	0.53	**0.80**		
Visual attractiveness	0.23	0.16	0.27	0.34	0.51	**0.88**	
Attitude towards use	0.32	0.13	0.22	0.27	0.37	0.26	**0.82**

Note: the bold scores (diagonal) are the AVE's of the individual constructs. Of the diagonal are the squared correlations between the constructs.

Structural model

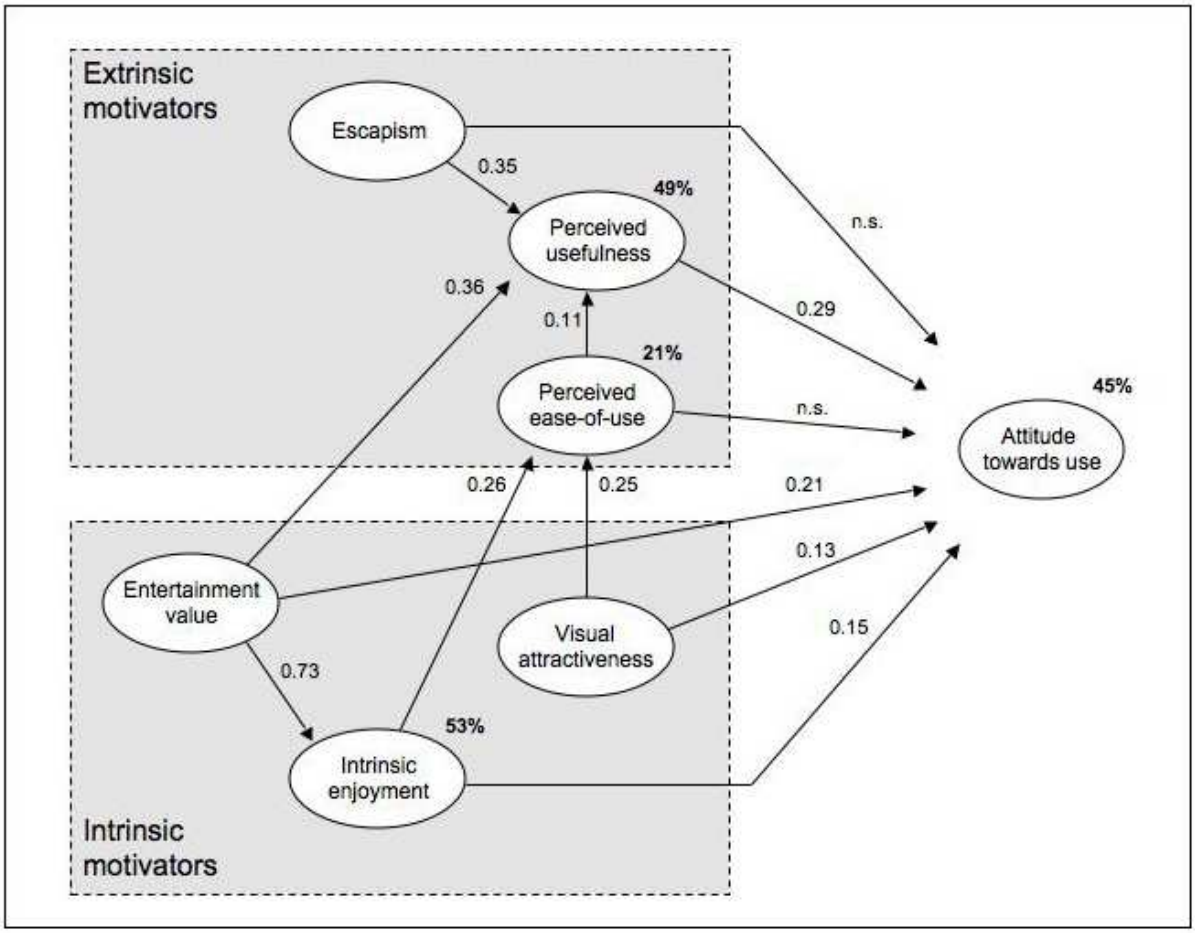
We then estimated the path coefficients (ß) and R^2 values of the structural model using the bootstrapping technique (1627 re-samples; cf. Hesterberg, Monaghan, Moore, Clipson and Epstein, 2003). To evaluate the significance and effect sizes of the path coefficients, we conducted two-tail t-tests with a significance level of 0.01 (see Blalock, 1979). Table 4 shows the overall results, which are also summarized in figure 2.

Table 4. PLS Path coefficients and t-tests (n=1627)

Hypothesis	Path	ß	t-value	Significance
1	Perceived usefulness → Attitude towards use	0.294	10.528	<.001
2	Perceived ease of use → Attitude towards use	0.031	1.360	n.s.
3	Perceived ease of use → Perceived usefulness	0.114	5.298	<.001
4	Escapism→ Attitude towards use	-0.004	0.152	n.s.
5	Escapism→ Perceived usefulness	0.345	14.151	<.001
6	Intrinsic enjoyment → Attitude towards use	0.153	4.986	<.001
7	Intrinsic enjoyment → Perceived ease of use	0.262	9.255	<.001
8	Entertainment value→ Attitude towards use	0.207	4.970	<.001
9	Entertainment value → Intrinsic enjoyment	0.730	48.047	<.001
10	Entertainment value → Perceived usefulness	0.356	14.794	<.001
11	Visual attractiveness → Attitude towards use	0.125	4.173	<.001
12	Visual attractiveness → Perceived ease of use	0.246	8.438	<.001

Note: all expected relationships are positive in nature; n.s. refers to non-significance

Figure 2. Results PLS structural model



Note: all path coefficients are significant at p<.001

Overall, the results strongly confirm the predictive power of the model. The amount of variance explained is high, implying a good fit to the data. The results indicate that ten hypotheses (H1, H3, H5, H6, H7, H8, H9, H10, H11, H12) are supported and two (H2, H4) are rejected. Six significant paths are of substantial strength (>0.19; cf. Chin, 1998b), while significant but smaller effects are reported for four paths.

DISCUSSION

Key Findings

Our research has a number of key findings. First, the study reveals direct effects of the extrinsic belief perceived usefulness and the intrinsic beliefs intrinsic enjoyment, entertainment value and visual attractiveness on the attitude towards virtual world usage. Together, these concepts explained 45% of the attitude variance, which is quite impressive. Perceived usefulness and entertainment were the strongest predictors. The influences of intrinsic enjoyment and visual attractiveness were less strong. Overall, these findings support the proposed expansion of IT adoption drivers beyond general technology beliefs, and confirm the inclusion of intrinsic enjoyment, entertainment value and visual attractiveness. Second, our work provides strong support for the reinforcing role of intrinsic motivation on extrinsic motivation. We demonstrate that higher levels of enjoyment, entertainment, and visual attractiveness contribute to the perceived usefulness and perceived ease of use of virtual world systems. All proposed effects were significant and rather strong in nature. Adding to our first key finding, this finding suggests that intrinsic beliefs function as first- and second-order determinants of the attitude. Third, the results show that perceived usefulness mediates the effects of the extrinsic motives escapism and perceived ease of use on attitude. Contrasting our expectations, perceived ease of use and escapism did not directly relate to attitude. A justification for the non-significance of perceived ease of use comes from literature claiming that ease of use solely affects behavior when a) users are inexperienced (Venkatesh, 2000) and/or b) the system is highly unusable (Van der Heijden and Verhagen, 2004). Since the vast majority of our respondents used Second Life on a regular base, and the mean score of perceived ease of use was 3.91[4] (see Appendix), these conditions are unlikely to apply to our research. Regarding the non-significance of escapism, we notice that, in line with the literature, its conceptualization reflects the instrumental value of a virtual world to achieve a particular goal (i.e. to 'escape'). As such, this task-specific behavioral belief reflects a perceived system benefit and is most likely to be used directly to form assessments about the general behavioral belief usefulness (Venkatesh and Davis, 2000; see also Ajzen and Fishbein, 1975), instead to judge about an overall disposition towards system use (i.e. the attitude).

[4] A score of 3.91 on a 7-points Likert scale (n= 1627). On the scale continuum, the score '1' implies very unusable while the score '7' reflects very usable.

Theoretical Implications

This research is one of the first to understand the user adoption of virtual worlds. We introduced and tested a model that integrates and extends existing models on utilitarian and hedonic system use. Given the fit of our model on a relatively large sample, which implies approximation of true population parameters (Chin et al., 2003), we demonstrated that existing utilitarian and hedonic models fall short in explaining MPIS use. Our findings underline that user adoption of MPIS advances through two belief configurations, and support that extrinsic and intrinsic motives function simultaneously in adoption decision-making (cf. Engel et al., 1995). Future theoretical efforts could incorporate this evidence and test its applicability across different contexts.

The parsimony of prior adoption models has given rise to much debate (see Plouffe et al., 2001; Venkatesh, 2000). This study advocates usage of more comprehensive models. Especially in settings where extrinsic and intrinsic motives explain adoption behavior there seems 'value in sacrificing parsimony to include a richer set of antecedents to predict adoption' (Plouffe et al., 2001, p. 209). By putting richness before simplicity a deeper reconstruction of actual behavioral processes (i.e. reality) is accomplished (Midgley, 1984), and important criteria for theoretical model building such as accuracy, depth, predictive power and originality are met (Bunge, 1961). To approach reality more closely, we proposed and verified a more complete range of motivators. Grounded in the literature on utilitarian and hedonic system adoption, our model included the extrinsic general technology beliefs perceived usefulness and perceived ease of use as, and the intrinsic belief perceived enjoyment. Drawing upon consumer behavior research, we added the extrinsic belief escapism and the intrinsic beliefs entertainment value and virtual attractiveness. We believe the strong empirical support for the nomological network validates richness and comprehensiveness as criteria for modeling MPIS adoption behavior.

To advance our understanding of the behavioral dynamics behind MPIS use, this study suggests two patterns on the consequences of intrinsic motivation. First, we challenged the claim to sufficiency of previous models such as TRA and TAM (cf. Venkatesh, 1999), and demonstrated that intrinsic motivation directly affects the attitude. As such, this research suggests an instantaneous role of extrinsic and intrinsic motivation in MPIS adoption (cf. Hong and Tam, 2006). Second, we proposed intrinsic motivation as antecedent of extrinsic motivation. Building upon motivation theory and IT adoption research, we show that intrinsic motivation

reinforces the effect of extrinsic motivation on attitude. Although this proposed order effect is theoretically plausible, and aligns to the fact that we included intrinsic motives to an existing base of extrinsic technology beliefs (and not vice versa; see also Venkatesh, 2000), this finding contrasts with previous IT adoption works showing that extrinsic motivation precedes intrinsic motivation (e.g. Davis et al., 1992; Van der Heijden, 2004). Apparently, the relationships between extrinsic and intrinsic motivation are more complex than initially thought and more research is needed.

Implications for Practice

From a practical point of view, this research provides insight into the range of drivers behind virtual world use. General technology beliefs (usefulness, ease of use) as applied in traditional research (TAM), and refinements made by inclusion of system enjoyment (e.g. Davis et al., 1992; Van der Heijden, 2004), are important issues. However, this study demonstrates that the nature of virtual worlds demands for a more holistic approach. A key challenge for system development seems to implement a mixture of task-driven and multi-sensory functions and features. To assist system developers in their efforts, we propose the following.

First, our findings highlight the roles of intrinsic and extrinsic motivation as direct determinants of virtual world adoption. To directly affect adoption behavior, developers should enhance a virtual world's usefulness, entertainment, enjoyment, and visual attractiveness. As such, both productive and prolonged can be triggered instantly. Second, our research draws attention to the potential of integrating instrumental and enjoyable/new/challenging functions and features. The reinforcing influence of intrinsic motivation on extrinsic motivation guides such integration. By employing features like, for example, attractive designs, funny navigation (e.g. flying; using cars, boats, planes), and entertaining video and sound integrations, usefulness and ease of use can be enhanced. Third, to further prioritize development efforts, our findings underline the vital function of perceived usefulness and entertainment value. Both constructs have strong direct effects on the attitude. Moreover, usefulness mediates the influence of ease of use and escapism on the attitude, and entertainment value has strong second-order effects via usefulness and intrinsic enjoyment. Being key influencers of virtual world adoption, a focus on both constructs and their determinants is likely to enhance the effectiveness of system development endeavors.

To conclude this section, we briefly reflect on the generalizability of the managerial propositions above. It is important to realize that virtual worlds embody a rising class of MPIS. Although this research is tailored to virtual world systems, it is conceivable that the suggestions can (at least to some extent) be extrapolated to other MPIS. Being indicative for a broader range of systems, our directions provide first guidance to MPIS development in general. To further refine particular design and development efforts, we recommend replication of our survey to actual usage settings. Such cross-validation validates the robustness of our suggestions and assures alignment with the particular system to be developed.

Limitations and additional recommendations

A potential limitation of this study concerns sample bias. The sample of Dutch Second Life users implies external validation in Western culture. Scholars in the fields of information system research (e.g. Al-Gahtani, Hubona and Wang, 2007; Straub, Loch and and Hill, 2001) and online consumer behavior (e.g. Moon, Chadee and Tikoo, 2008; Sundqvist, Frank and Puumalainen, 2005), however, have shown that cultural differences are likely to affect IT adoption. For example, in comparing collectivistic versus individualistic cultures Davis, Wang and Lindridge (2007) demonstrate that online consumers in collectivistic societies suppress the exploration and expression of emotions. In such settings, perceptions of pleasure can be assumed to have a relatively weak impact on online system use (Davis et al., 2007). Extrapolating this research finding to virtual world adoption, it is believable that the influence of intrinsic motivation is weaker in non-Western cultures. Future research may test this assumption by cross-validating our research across different cultures.

Another limitation concerns the rather general and self-determined view on behavioral motivation. This view aligns with the applied definition of virtual worlds and, since intrinsic motivation closely relates to autonomous extrinsic motivation (Ryan and Deci, 2000 a, b), supports the usage of an integrative model to explain virtual world usage in general. More controlled forms of extrinsic motivated behavior, however, fall outside the scope of our research. To deepen our understanding of virtual world adoption, it might be of interests to adapt the target specificity of our constructs and test the model across different types of more specific behavior. A possible direction for such extension is to build upon the continuum of self-determination (see Ryan and Deci, 2000 a, b) and compare the impact of extrinsic and intrinsic

motivators for autonomous versus more controlled forms of virtual world usage (e.g. attending obligatory courses; obtaining legal advice). The virtual world as multipurpose system facilitates diverse behaviors which underlying processes, analogue to the different levels of self-determination, vary from rather utilitarian to rather hedonic in nature. As such the traditional distinction between purely utilitarian and hedonic systems (cf. Van der Heijden, 2004) seems superfluous. Instead, a key challenge for MPIS research becomes to understand the weights of extrinsic and intrinsic motivators in utilitarian versus hedonic behaviors within the same system. As such, we foresee and recommend a shift in focus from across-system comparisons to intra-system across behavior study.

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APPENDIX: MEASUREMENT SCALES

*** = removed after EFA

Perceived usefulness (general) (Seven point Likert scale ranging from highly disagree to highly agree; Hong, Thong and Tam, 2006; Porter and Donthu, 2006; Van der Heijden, 2003). Mean (SD) = 3.17(1.466)

1) I find <name virtual world> useful in my life.
2) I find that <name virtual world> adds value to my life.
3) Overall, <name virtual world> is useful.
4) Using <name virtual world> helps me accomplish things more quickly.
5) Using <name virtual world> makes my life easier.
6) Using <name virtual world> can make one productive.***
7) <Name virtual world> can make things easier. ***

Perceived ease of use (Seven point Likert scale ranging from highly disagree to highly agree; Hong et al., 2006; Porter and Donthu). Mean (SD) = 3.91 (1.628)

1) Learning how to use <name virtual world> is easy.
2) <name virtual world> is clear and understandable to use.
3) It is easy to become skilful at using <name virtual world>.
4) Overall, <name virtual world> is easy to use.

Escapism (Seven point Likert scale ranging from highly disagree to highly agree; Kim and Kim, 2005; Mathwick et al., 2001). Mean (SD) = 3.96 (1.617)

1) Using <name virtual world> makes me feel like I am in another world.
2) Using <name virtual world> "gets me away from it all".
3) I get so involved when I use <name virtual world> that I forget everything else.
4) Using <name virtual world> truly feels like "an escape".

Intrinsic enjoyment (Seven point Likert scale ranging from highly disagree to highly agree; Mathwick et al., 2001; Van der Heijden, 2003). Mean (SD) = 5.43 (1.263)

1) Irrespective of whether <name virtual world> gives me what I want, I enjoy using it for its own sake.***
2) I use <name virtual world> for the pure enjoyment of it.
3) I use <name virtual world> for pleasure.
4) Using <name virtual world> is an agreeable way of passing time.

Entertainment value (Seven point Likert scale ranging from highly disagree to highly agree; Mathwick et al., 2001; Richard, 2005). Mean (SD) = 4.87 (1.426)

1) I think <name virtual world> is very entertaining.
2) The enthusiasm of <name virtual world> is catching, it picks me up.
3) Using <name virtual world> entertains me.
4) I think <name virtual world> is exciting. ***
5) I think <name virtual world> is imaginative.

Visual attractiveness (Seven point Likert scale ranging from highly disagree to highly agree; Mathwick et al., 2001; Van der Heijden, 2003). Mean (SD) = 4.92 (1.336)

1) The way things are displayed in <name virtual world> is attractive.
2) <name virtual world> is aesthetically appealing.
3) I like the way <name virtual world> looks.

4) Overall, I find that <name virtual world> looks attractive.

Attitude (Seven point Likert scale ranging from highly disagree to highly agree; Moon and Kim, 2001). Mean (SD) = 4.86 (1.183)

1) Using <name virtual world> is a good/bad idea.
2) Using <name virtual world> is a wise/foolish idea.
3) Using <name virtual world> is a pleasant/unpleasant idea.
4) Using <name virtual world> is a positive/negative idea.

Utilitarian-Hedonic value (Seven point semantic differentials. The response categories are: very, quite, some, neutral, some, quite, very; Carroll and Ahuvia, 2006; We conducted an EFA to confirm its unidimensionality and convergent validity. The alpha = 0.92). Mean (SD) = 4.93 (1.111)

<name virtual world>…:

1. is functional – is pleasurable
2. performs a task – affords enjoyment
3. is useful – is fun
4. does a job – is a sensory experience
5. is a necessity – an indulgence.